



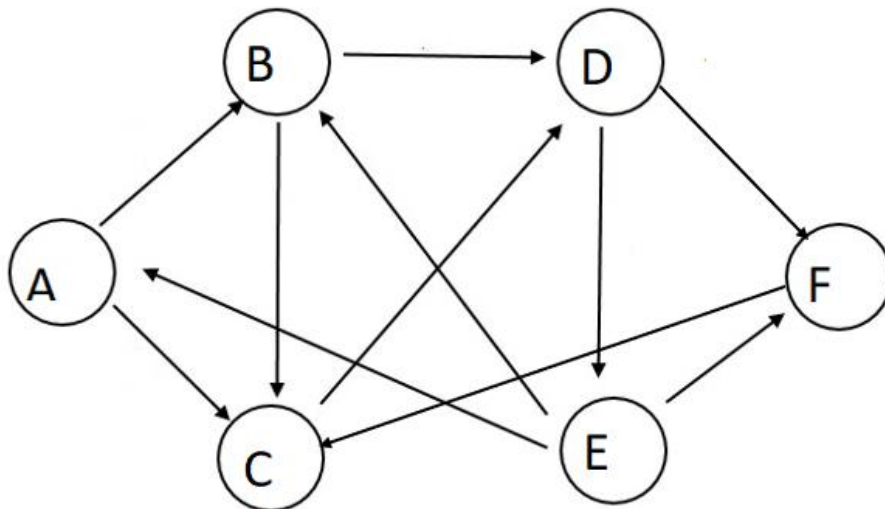
EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Final, Fall 2020

Course: CSE246 (Algorithms), Section - 1
Instructor: Taskeed Jabid
Full Marks: 25
Time: 1 Hour and 15 Minutes

Note: There are FIVE questions, answer ALL of them.

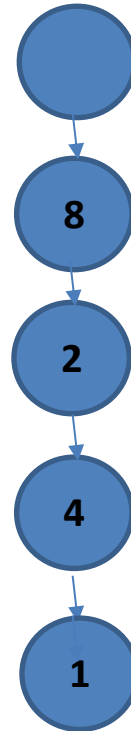
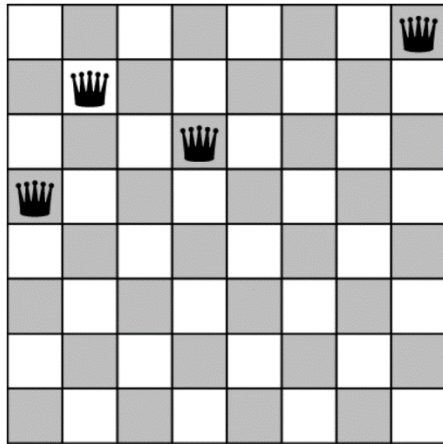
In some question, you need to choose some input data. I expect that no input data set will be same with any other script.

1. Assign weight of the edges of the following graph from the set of integers ranging from 1 to 15. Run the Dijkstra shortest path algorithm on the following graph, starting from vertex A. Specifically, fill in the following table below according the steps of the algorithm. [If your ID is odd then choose all weight as odd number, and vice versa]



Iteration/Vertex	A	B	C	D	E	F
0	0/NIL	Infinity/NIL	Infinity/NIL	Infinity/NIL	Infinity/NIL	Infinity/NIL
1						
2						
3						
4						
5						
6						

2. Consider the 8-Queens problem. That is, the problem of placing 8 Queens on a 8×8 chessboard so that no two Queens can attack each other. Draw the remaining search state space tree explored by this algorithm considering first four steps are already known as shown in the following figure.



3. Using the weighted graph value of question 1, what will the value of D^0 and D^1 be if you apply the Floyd-Warshall algorithm. [Fill-up only first three rows of the D^1 matrix if your ID is odd; last three columns of the D^1 matrix if your ID is even]
4. Write down the Rabin-Karp algorithm and discuss the working principal of the algorithm.
5. Mr. Hasnat has two children who, unfortunately, dislike each other. The problem is so severe that not only do they refuse to walk to school together, but in fact each one refuses to walk on any road that the other child has stepped on that day. The children have no problem with their paths crossing at a corner and/or crossing. Fortunately both the professor's house and the school are on corners, but beyond that he is not sure if it is going to be possible to send both of his children to the same school. The professor has a map of his town. Show how to formulate the problem's solution and of determining whether both his children can go to the same school as a maximum-flow problem.
[Hint: You can consider Mr. Hasnat's home as a source node and children's school as sink node.]